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SUGGESTIONS FOR A PHILOSOPHY OF EDUCATION.

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EDITED BY

G. STANLEY HALL, PH. D., LL. D.

President of Clark University, and Professor of Psychology and Education.

OCTOBER, 1897.

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SUGGESTIONS FOR A PHILOSOPHY OF EDUCATION.¹

A. CASWELL ELLIS, Fellow in Clark University.

After surveying the great attempts of the human mind to build a philosophy of education, one can but be impressed with the fact that all of them together are far better than any one, that each is based upon some real facts and principles of the

¹ This is the last chapter of a work which attempts to make an exposition and criticism of the great philosophies of education, to show their relations, and to point out the larger philosophic and psychologic ideas out of which the various educational systems have grown.

These are discussed in order, the Greek educational philosophy, including Socrates, Plato and Aristotle; the Early Christian—Neo-Platonic philosophy and the consequent "other worldly" educational theories; the revolution resulting from the introduction of the new method in psychology and philosophy, as expressed principally by Bacon, Locke, Rousseau, Pestalozzi and Comenius; then the opposite swing of the pendulum arising from the "rediscovery of the inner-life" and the growth of idealism as represented by Kant, Fichte, Schelling, Schiller and Hegel; the reaction coming from the application of Herbart's materialism and advanced psychology; the great eclectic and "romantic" educational philosophy of Froebel; and the evolutionary philosophy of Spencer. The final chapter, here presented, is an attempt to indicate the more important factors to be considered and the lines upon which a future and larger philosophy of education must build, as they are suggested by the recent vigorous work in Anthropology, Biology, Physiology, Psychology and Child-Study.

Such a chapter does not hope to be final; for data is as yet too meagre for much safe generalization, but it is hoped, by such a collection and study of the mass of new facts, gathered here and there in the various fields, that several general tendencies may be clearly shown, as never before, that workers may be stimulated by seeing these valuable results and hopeful lines for research, and receive such suggestions as will help to better direct and shape future experiments.

The writer wishes to express his very great indebtedness to his colleagues here, who have so cheerfully and generously turned in to him the cream of their work of years in various fields of original research—often before their own papers were published. Their suggestion, encouragement and criticism have been of great aid. There is hardly an idea presented that has not sprung from or been developed by suggestions from Dr. Hall, to whom I can give due credit only by saying that without his inspiring suggestions in lecture and conference the work would have been impossible. He is not, however, responsible for this crude work and would doubtless not agree with some of the views here expressed.

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human soul,¹ none satisfy all. There is, as yet, no philosophy large enough to contain or explain all the facts of the psychic universe, and until this is possible no philosophy of education can be complete.

It does seem that it would be profitable now to make a careful comparison and combine the undoubted truths of all these past philosophies, and to suggest briefly the lines upon which the more recent discoveries in biology, physiology, anthropology, psychology, and child-study indicate that a larger and truer future philosophy of education must be developed.

The Nature of Man as conditioning Education. Whether man is considered to be by nature primarily good or bad must ultimately condition any theory of education. With the knowledge at hand in the past centuries, it is hardly to be wondered at that no thorough discussion of this question was made. First comes the church dogma of the natural total depravity of man; then varying forms of the philosophic concept that a certain faculty, generally the reason, is divine, while another, generally the feeling, is devilish; then the Kantian idea that man is primarily neither good nor bad; and, finally, the worshippers of nature, with Rousseau and Froebel, declare that there is only good in man.

Certainly, each of these theories of the human soul must demand a radically different theory of education. Since all of them survive, all must have some basis of truth.

A rational and scientific theory of human nature can neither accept, in its usual meaning, the church doctrine of the fundamentally evil nature of natural man, nor can it agree with Froebel and the worshippers of nature, in saying that there is naturally only good in man. This confusion is brought about first by not recognizing the relative nature of what is good. Characteristics that in one stage of human development were necessary and good, may from the changes in a later, higher stage of development, be then bad. That human nature is gradually reaching a higher and purer stage of development shows that, fundamentally, man is created by God with the

It is hoped to bring this work fully up to date at the publication of the entire volume next year, and the author cordially invites personal information of future work and of such recent reports as have escaped his notice, bearing in any way upon the problems here discussed or upon related questions.

¹ The word *soul* is used in this chapter instead of *mind* as a convenient term to include the entire activities of intellect, feeling and will. It matters not for our purposes here whether readers interpret it as a transcendental entity of some kind, or as a "stream of thought," or complex of associations. The term *mind* is not used, since this term would suggest to a large body of readers merely intellectual activity.

greater tendency upward, or toward the good; but if there is any truth in the doctrines of heredity and in the evolutionary theory of the fundamentality of the fierce and selfish struggle for existence in past ages of development, then man has inherited a disposition that is in the light of the later developed and higher Christian altruism fundamentally selfish, and hence, from this point of view, bad, however useful it may have been in the race, or may even be now to bridge over certain undeveloped stages before the higher altruism is possible. These facts can hardly be denied, and it is from this standpoint, with this view of the soul, that education must approach the child. This embraces the truth of Froebel, and yet does not ignore the no less potent truth of the older Church dogma. If we take the view that feeling in man is but the psychic extract or residuum of past habits and intellectual practices of the race, then the philosophic concept is included, or, rather, modified to meet the demands of modern science.

Basing education upon this apparently unquestionable foundation, the first and primary duty of the educator is to give the widest and freest possible scope to the natural unfolding of all human potentialities consistent with self preservation, believing in the fundamental tendency of man upward, to look forward to a plane of human development not yet known, and to keep out of the way of the tender buds of developing humanity, with the firm faith that they may grow up to a higher air and purer sunshine than we can now supply.

Secondarily, the educator, knowing the history of the race and the laws of heredity, must ever watch the outcrop of those hereditary tendencies that belong to an age gone by and point to a reversion, or retrogression from the present high scale of being. Upon the immediate recognition and the proper treatment of these tendencies depend the success of education, the weal or woe of human life. Thus, the consideration of human history is all important in the education of man, but cannot set the standard or show the goal. It must fix the lower level, it must guide in elimination, but only a knowledge of a developing human soul and a sublime faith in the divine potentialities of man can furnish the primary motive of education worthy of a God-given and developing race.

Any utilitarian or economic ideal is from this point of view unworthy; to make it the end of education to prepare the child for the civilization and society in which he moves is low. This does not refuse to recognize that psychologically the only way to develop beyond the present stage of society is first to fully develop up to it; but it does contend that a philosophy of education which makes the chief end of education to be the preparation of men to fill the various niches in the present

social, political or economical life, sets its face toward a deadening past, and fails to measure up to its possibilities, in not giving an all-sided development to the human potentialities and leaving room for the growth of every latent power, with the belief that there is far more yet in the human soul than we can understand or present civilization give adequate expression. Rest assured that he who has developed the many-sided interests of his own nature will be at the same time well fitted to take his part in what is worthy in the civilization around him and lead it to a higher plane.

Prevailing Educational Inadequacy. In spite of our boasted progress, and there has been remarkable progress in the last decade, the whole plane of education is narrow and teaching tinged with a low and unworthy utilitarianism, which colors our whole American civilization.¹ It is not pleasant to contemplate, but it is true that the educational efforts of our schools are almost entirely directed towards the cultivation of those intellectual capacities which give their possessor power over his fellow man, or ability to heap up the goods of this world, by handling the forces of nature.

The larger part of the pupils leave the schools with no higher aim than to outstrip their neighbors, not to help them, in the pursuit of the comforts and luxuries of life. The better schools do indeed stimulate their pupils to emulate the brilliant thinkers, warriors, statesmen, philosophers, who have heaped up power and treasures of intellectual fame, but why are not the great hearts and souls of the world also set before the students, why do we not give a broad development also to the emotional and volitional sides of life, cultivate more normally the æsthetic, the ethical, the religious sides of human nature? Education seems verily intellect mad.

¹ Such a statement cannot, of course, claim scientific accuracy, though experience in several sections of the country and consultation with many others of larger experience leave no doubt in the writer's mind that this is true. Hattie Mason Willard ("Children's Ambitions." *Studies in Education*, p. 243,) found by tests of more than a thousand children in several parts of the country, that by far the larger number of boys said they were influenced by considerations of money in choice of ambitions, while it was the second highest motive with the girls. Will S. Monroe ("Children's Ambitions," *N. E. Jour. of Ed.*, June 28, 1896) found a similar condition of affairs in his study. Chas. H. Thurber and J. P. Taylor, in "Children's Hopes" (*Report of State Supt. of Pub. Inst., N. Y.*, 1896, pp. 992-1012), show that of 2,000 children examined, the reason given for choices of their ideal occupation were as follows: "to earn money," 25% at 7 years of age, 52% at 12 years, then decreasing to about 30% with adolescence; "I like it," 45% at 7 years; 32% at 12 years, decreasing then to 20% during adolescence; "It is nice," average about 12% all the time. These three motives most prominent in New York children certainly do not indicate lofty ideals.

We seem to forget that if we should succeed in keeping everybody in a comfortable house, with plenty to eat and disease almost eliminated, we would then just be on a level with the beavers and ants, as Benn well says. Intellectual force and rational power are surely high and noble attainments, but cold reason cannot alone handle many of the deeper problems of life, and there are depths of the soul to which it gives no adequate expression.

The great danger to our civilization and to democratic government is that the goods of the country are being heaped into the hands of a few men possessing peculiar ability, and the great mass of humanity are yearly becoming poorer, more unable to care for themselves and more jealous of those favored few. This we are trying to remedy by furnishing to the poor man's son an equal opportunity for education and preparation for this grab-game of life as is furnished the rich man's son. Thus it is hoped by equalizing the talent, that each will be able to get a share of the world's goods more commensurate with his needs. Such a result will never come from the present system of education. Equal education can never equalize ability, and, furthermore, the educated son of the poor man is seen in experience to be equally oppressive with his accumulated wealth and exposed to far more jealousy and hatred from the populace. The root of the whole evil lies in the kind of education given to rich and poor alike. The utilitarian and money-getting, so called "practical," side of life must be balanced off by giving in the schools a deeper appreciation of those spiritual elements in man's nature which alone distinguish him from the brutes. They must feel that there are inexhaustible stores for the human soul, far beyond mere wordly goods or intellectual possessions, and that this truer wealth can be shared by every one to his full capacity without limiting the supply to his neighbor, that of this wealth it may be truly said that he who scattereth abroad increaseth. The full breadth and depth of the human soul must be better touched by our educational efforts, and the abnormal amount of attention given to the logical, intellectual faculties be balanced by a more sane development of those no less human and God-given powers which so potently affect life and character, and whose proper development alone can make the sane and wholesome life. In a word, full unity and balance of the human soul should be maintained and the whole man educated.

No better evidence of the one-sidedness of our educational systems could be presented than the fact that practically every effort of the whole pedagogical world is bent upon devising systems of study and methods, and formal steps for communicating a fund of human knowledge to the children in the

shortest possible time ; the test everywhere is facility in passing a series of fragmentary, formal examinations, while few think it worth while to look outside the self inclosed circle of intellect, or cease spinning round in the squirrel cage of their own little system to see whether anything is left outside, or whether the whole movement is tending. It is only a few, therefore, that think it of any value to go down into the philosophic principles that underlie and condition our present systems, or see the necessity for a new examination of the human soul in order that no jot or tittle of its possibilities may be neglected in the educational endeavors.

Factors in Determination of Course of Study. From the standpoint of modern biology and psychology, the course of study cannot be properly determined from an examination of history or of the present needs of adult life. Education seems destined to undergo the same radical and life-giving change of standpoint that biological science has just begun to experience. The examination of the preserved dried bones of the past and of the disjointed cadaver, while still important, is yielding to the study of living tissue and, above all, of growing embryos. Never did the secrets of growth and development open their truths till the careful scientist rose above anatomy and laid the living, developing tissue and organism under the microscope. The composition and laws of living tissue are seen to be not at all those of dead matter ; the growing embryo is a far different being from the parent, showing many varied laws and phases of development, all differing from the adult and demanding different food and treatment.¹ Just so is educational psychology beginning to see the shortcomings of the dried systems of the past, and of adult psychology, and is placing the living, growing children under its scrutiny, with results that give every reason to believe that here will be found at work psychic forces and principles of growth that are lost to adult years, as much as are the primitive gill slits and foetal hair of the embryo.

From this point of view, the evidence begins to show that soon the entire curriculum will have to be reconstructed, not with a view to the needs of adult life, but with a view to the needs of the growing organism at each stage of its varying development, the proper food and nourishment at one stage having no necessary logical connection whatever with the requirements of later stages, or even being a positive poison if given after that period—growths probably being demanded at certain periods which must later be sluffed off, absorbed, or transformed.

The problems of pedagogy are shifting from a search for the

¹ See Minot—"Human Embryology;" Ernst Haeckel—"Anthropogenie."

shortest method of giving the knowledge supposed to be necessary for adult life, to an effort to find the outlines of the different periods of psychic development, their demands, laws of growth, and relation to succeeding stages.

Recapitulation Theory. The philosophic speculation of Kant, Herbart and others that the process of development of the individual is parallel to the development shown in the race, and that the culture material utilized by the race in each stage of its upward growth is that best suited to children in analogous stages of development, has been given some scientific basis by the recent work in anthropology and child-study.

This theory while found in the main true, does not hold in the crude way that the early curricula of the Herbartians would indicate. Former ideas, both of the savage and of the child, have undergone a great change on account of a better knowledge gained of each. This knowledge is being enlarged rapidly now, and pedagogy may hope soon for light enough for the working out of this theory in sufficient clearness to give a general outline to the whole course of study.

*Parallelism.*¹ Many theories have existed with regard to the child: First, the child is equal to primitive man; "Human nature is generally akin . . . and the motives of an adult barbarian are very similar to those of a civilized child," says Francis Galton; Second, the child physically and mentally does as the race did; Third, the child is equal to genius. Confucius and Coleridge held this. The youthful Messiah stories so common are said to be a product of this. "Genius is born, not made." The spontaneity and direct mental habits of each, the skipping of logical, conscious processes in thought by children and geniuses, give color to this theory; Fourth, the child is equal to woman. This is primitive in origin, specially prevalent in the Orient. Women and children are sociological equals among savages; Fifth, the child is equal to the alien, or mentally deficient. Solomon speaks of the foolishness of babes. The old proverb, "Children and fools have many lives," expresses this. It is true that acts perfectly normal in a child would indicate insanity in an adult; Sixth, the child is equal to the criminal. The total depravity dogma of the church is one expression of this. The apparent cruelty and lack of high ethical ideals in children furnish a basis for

¹ For this portion of the work I am greatly indebted to the lectures of Dr. Alex. F. Chamberlain, of Clark University.

For a different discussion of this topic of parallelism see the second Year Book of the Herbart Society. Baldwin's "Mental Development" has the most interesting, suggestive and scientific treatment the matter has yet received. This needs now, however, to be rewritten, incorporating larger data of anthropology and child-study.

this theory ; Seventh, the child is equal to the aged. The Greek saying, " Men are twice children," or the expressions " second childhood," etc., the old notions of " fountains of youth," " elixirs of life," etc., are all indications of such a conception. Some children have recently been found to believe also that old people shrink away again to the size of infants.

As to the theory of parallelism between the child and primitive man, most recent returns would indicate that :

1. In emotional life, fear, anger, shame, impulsiveness, etc., the parallel is not proven, except in most general terms.

2. In mental content there is a notable parallel, but both children and savage races vary among themselves greatly. They both, however, reason very largely from analogy.

3. The music of each is very similar.¹

4. Both are very susceptible to hypnotic suggestion, and imitation plays in the lives of both a tremendous role.

5. The games and amusements are similar, and the more thorough investigations now indicate that the savage is full of the spirit of play, and appears silent, stern and morose from a very childlike reserve before the ordinary visitor.

6. The use of idols, fetishes, toys, etc., by primitive peoples is well paralleled in the child's doll and other toys.

7. The multiplicity of dialects and the general instability of speech among savage peoples is well paralleled by the instability and the mutations characteristic of the speech of children, and by the special languages they sometimes invent. In scribble writing and in drawing they show considerable similarity.

8. The powerful imagination and lack of regard for truth, specially when dealing with persons disliked, present a striking parallel, as does the holding of one ethical code for friends and another for other people.

9. Very interesting and striking is the natural developing among boys of sociological laws, as reported by Johnston,² paralleling the growth of law in the race ; first of common land holding, then of individual ownership, next of monopoly of lands, and finally the rise of socialism clamoring for redistribution—all of this occurring, not because of any moral or ethical ideal whatever, but being first forced upon the weaker by a few stronger boys and then adopted by common agreement and perpetuated by custom.

Likewise, the development of the sense of law and justice,

¹ Consult " Rhythm," by T. L. Bolton, *Am. Jour. of Psychology*, VI, 2, and " The Tshi-speaking People of the Gold Coast of West Africa," by A. B. Ellis, Chapter on Music.

² John Johnson, Jr. " Rudimentary Society Among Boys ; " Johns Hopkins University, Studies in Historical and Political Science, Second Series, XI.

and of the ideas of punishment in children, as reported by Barnes,¹ follows very closely the same development in the race ; first, of undiscriminating severe corporal punishment, mostly from vindictive personal reasons, then of discriminative punishment for the protection of society as a whole, and, finally, with the added purpose of reforming the criminal.

Periods of Development. The few studies made of the physical development and of the contents of the minds of children, their sentiments, desires, etc., at different ages, indicate quite clearly at least three widely differing successive phases of development in every child, each with characteristics peculiarly its own and demanding very different methods of both physical and mental training.

These periods are, roughly, childhood, adolescence, and manhood,—childhood extending to the period of pubescence, with its marked physical and equally marked concomitant psychic changes ; adolescence verging into manhood as this vast psychic upheaval quiets down upon the completion of growth and the full development of the psychic and physical organs for the battle of life.

These very apparent general periods have often been marked before by the philosophers, but a knowledge of their real content and meaning for education is not yet fully attained, though recent study, particularly of very young children and of adolescents, has brought out much that is of the greatest importance for education.

The age of childhood is further divided into two greatly differing periods, from birth till about seven, and from seven till puberty, but that these demand different treatment from teachers is not yet indicated.

Physical Development. From birth until about the seventh year the growth of the body is very rapid, and the sense organs then reach practical perfection. The works of Bowditch, Kotelmann, Pagliani, Key, Hertel, Erismann, Hansen, and Roberts,² all, when due allowance is made for quite small variations on account of racial, climatic and other influences, agree in showing that boys grow slowly from seven till about thirteen, when a rapid acceleration in the rate of increase in height takes place and lasts until the period of puberty is past at about sixteen, when it drops to a slower rate even than before the pubertal shoot. In weight, likewise, the rate of yearly increase is extremely small from seven till about thirteen, but is greatly accelerated from about thirteen to seventeen. Girls exhibit the

¹ Earl Barnes. *Studies in Education.* See also notes p. 176.

² See "Handbuch der Schulhygiene," Burgerstein und Netolitzky, p. 284, for complete tables of all except Roberts and Hansen.

same phenomena except that increase in height begins about two years earlier, at near ten, and continues until fourteen, while the unusual increase in weight begins about twelve and does not cease until fifteen or sixteen. The boys reach physical maturity hardly before twenty-four years of age, while the girls are physically mature at about eighteen.

Brain Growth. The brain at birth is six times as large in proportion to the size of the body as it is in adult life,¹ weighing about 372 gmms.; all the nerve cells ever to be in the brain are present, but only a very few are developed to functional maturity, as is shown by the small number of medullary sheaths in the cortex.² They develop, however, with incredible rapidity, first over the areas for vision and then the other sensory-motor areas, and last of all are developed the areas for association. While there is every reason to believe that this increase in medullation and growth of association fibres goes on, progressing from the fundamental to the accessory parts of the organism, till about forty-five years of age,³ yet conclusive evidence for this on the neurological side is still wanting; for, as Flechsig says, the brain is so fully medullated by the tenth month in all areas that it is impossible with present methods to study the later medullation accurately.

Donaldson,⁴ quoting Seguin, says that the centers for movement of proximal joints are developed before those for the more distal ones, and it is generally accepted by neurologists⁵ that the development does proceed from fundamental to accessory nerves.

This, apparently, must be based upon the fact that the embryo follows this general order in its development, and that the nervous system breaks down again in the reverse order, or from accessory to fundamental, and upon inference from the fact that young children are unable to properly co-ordinate movements requiring the adjustment of small muscles, as Hancock has shown.⁶

It is known that the motor nerves of the spinal cord are

¹ See Chapter X, p. 727, by Donaldson, "American Text Book of Physiology," edited by Howells. The brain makes up 12% of total weight of body at birth and about 2% in adult life.

² Vulpius. See also "Growth of Brain," by H. H. Donaldson, and "Gehirn und Seele," von Dr. Paul Flechsig, Leipsic, 1896.

³ H. H. Donaldson, Growth of the Brain, p. 244; or Kaes, Archiv. f. Psychiat. u. Nervenkrank. Bd. XXV, 1894.

⁴ Donaldson, "Growth of the Brain," p. 355. Seguin, "Archives of Medicine," 1879.

⁵ Ross, "The Diseases of the Nervous System," Vol. I, pp. 68-70.

⁶ John A. Hancock. "A preliminary Study of Motor Ability," PED. SEM., III, I.

better developed than the sensory at birth,¹ and that the child at birth is practically a sensory-motor reflex animal, with only the spinal cord and central gray masses, of the brain, and parts of the cortical areas for the special senses, developed to functional maturity. The development is nothing like complete even here, as Kaiser found over twice as many developed cells in a given area of the cervical enlargement of the cord at fifteen years as was found at birth.² The growth of the peripheral sense discrimination soon puts the infant ahead even of the adult, but the central discrimination increases gradually even through adult life.³

At three years of age the brain is two-thirds the weight of the adult brain, and some cells in all areas are seen to be developed, though not by any means all cells in any area. The gross weight of the brain increases from 372 gmms. at birth to over 1,300, or within 100 gmms. of full mature weight by about the seventh year. From then until about the fifteenth year, when it reaches its maximum weight, the growth is slow; what happens during adolescence and later is not well studied, and one can only say that the number of medullated fibres increases until about forty-five, when they tend to gradually decrease. All this period is probably given to growth of new connecting or association fibres, and the completion of the sheaths of those begun in early life. That this process is partly due to and dependent upon the effect of external stimuli is shown by the excessive number of granules and partially developed cells in the defective areas of Laura Bridgman's brain.⁴

The great work the neurologists must do for pedagogy is to push this research further and ascertain: first, what is the sure sign of functional maturity in a certain brain area, and, secondly, in what order the different areas reach such maturity as to profit most by those external stimuli that seem to be necessary. Then we might cease injuring unripe organs by too early use, and give those that have reached functional maturity the needed stimuli while still in a plastic condition.

*Development Diseases.*⁵ The various periods of development in the structure of the body are marked again by characteristic concomitant diseases, mostly of neurotic origin.

After the formative failures of intra-uterine life, probably

¹ Ambrogn and Held, *His. Archiv.* 1896, Heft. 3 and 4.

² Kaiser, *Die Functionen der Ganglienzellen des Halsmarkes*, 1891. Donaldson, *Growth of the Brain*, p. 164.

³ Czermak, *Gesammelte Schriften*, Leipzig, 1879. Donaldson, *Growth of the Brain*, p. 344.

⁴ Donaldson, *Growth of the Brain*.

⁵ These lists of diseases of the different periods are taken almost literally from Clouston, *The Neurosis of Development*, specially pp. 11-12.

due to deficient trophic innervation, such as hair-lip, cleft palate, genetous idiocy, etc., and after the severe crisis of birth and readjustment to new mode of life are passed, then comes the very rapid growth of the brain from infancy till seven or eight years of age. This is a period of dentition, of rapid special-sense education, and motor co-ordinations, and speech development, and is liable to be accompanied by convulsions, squint, stammering, night terrors, liability to high temperatures, and delirium at night with temperature 99 to 101°, infantile paralysis, tubercular meningitis, hydrocephalus, rickets, deaf-dumbness, some varieties of idiocy and imbecility, with rare cases of mania and melancholia, and other less frequent diseases. These are all connected with the immense brain growths, and the development of certain brain functions at that time, such as those of speech, muscular co-ordination, equilibration, special-sense organs, etc.

The next period is when muscular motion becomes co-ordinated with emotion, from 7 to 14 years of age. This is a period of very slow growth in brain bulk, but probably rapid medullation of association fibres, though sufficient neurological data on this are yet wanting. Then arise chiefly chorea, some forms of epilepsy, somnambulism, megrim, asthma, myopia, convergent strabismus, etc.

The next period is marked by the onset of reproductive capacity at puberty and its gradual perfection during adolescence, with the trophic, motor, emotional and moral developments accompanying this. The exact neurological changes here, too, are not yet discovered. At this period arise such diseases as certain forms of emotional and irrational willfulness and moral perversion, immorality, impulsiveness, stupidity, eccentricity, hysteria, epilepsy, megrim, Friedrich's disease, and above all adolescent insanity, with occasional dipsomania, frothy religionism, perverted sexual instincts, unfounded aversion to relatives, or to society, some joint diseases, acne, nasal pharyngeal polypi, acute rheumatism, etc.

This period of adolescence is certainly the focal point in life. Here the organism has reached that period where it may perpetuate itself, and the tribunal of nature gives it a severe testing before deciding that it shall pass through this stage. This is the time when the last struggle takes place between the rival qualities in heredity. Here the unsound heredity is most liable to show itself, and again here the sound heredity may fight its final battle, uproot the childish diseases of development and start the organism on the road to healthy life. Key has shown that, of 19,000 children examined, chronic diseases were better resisted at the period of maximum growth than at any

other,¹ and Hartwell has shown that, among Boston school children, fewer deaths occur at this period than any other;² so that the rule is commonly accepted, that the period of maximum growth is the period of maximum power to resist disease. Lancaster³ also has evidence that this is true when the maximum growth comes after puberty, whereas if it comes before that time, many of his cases indicate that it is liable to be accompanied with various nervous, digestive and eye troubles, insomnia or bad dreams.

Puberty arrives in boys at about 16 and about two years earlier in girls.⁴ This is accompanied by the growth of the pubertal hair, and in girls the enlargement of the mammary glands and rapid broadening and erection of the pelvis. There is higher blood pressure in all the arteries, except the pulmonary, which has less. Temperature is also slightly increased.⁵ Lancaster has also found several cases in which striking rapid changes occurred during this period in the features and facial expression, the child changing a stub or straight to a Roman nose, or dropping other features of the mother and taking on those of the father, or *vice versa*. The many cases collected of this are certainly of interest and have led Mr. Lancaster to uphold the theory that here at the completion of brain growth in adolescence there is a second struggle between the paternal and maternal potencies, each striving to fix itself, often resulting in readjustment because of the exhaustion of some potency previously victorious and its consequent displacement by the potency from the other parent—this struggle being the great exciting factor in adolescence. This theory needs more evidence, but is certainly of interest.

Mental Development. Noticeable as are the physical changes during these periods, the mental characteristics are no less distinct, as has been shown in the following investigations.

The first psychic activities are largely instinct-feelings with very vague accompanying ideas. The child does not learn even what his own body is till after two years old, as Sully shows. It was clearly shown in the study of "Dolls"⁶ that young

¹ Burgerstein, Axel Key's Schulhygienische Untersuchungen. Hamburg, 1889.

² E. M. Hartwell, Report of Director of Physical Training. Boston, 1891.

³ E. G. Lancaster, The Psychology and Pedagogy of Adolescence. PED. SEM., V, 1.

⁴ Charles Roberts, "Physical Maturity of Women." Mr. Lancaster finds in 200 cases examined that boys are earlier than this would indicate.

⁵ Dorn Blüth, Gesundheitspflege der Schuljugend, gives a careful account of the physical changes at puberty.

⁶ A. Caswell Ellis, and G. Stanley Hall, "Dolls" PED. SEM., IV, 2.

children fail entirely to distinguish subject and object and, even at seven years of age, may attribute their own feelings and desires to other objects. Their powerful imagination¹ and strong feelings master them so that they do not distinguish clearly between the real and the imaginary, and until they are four or five often do not know that their dreams are not realities. The line between feeling, will, and intellect is hardly distinguishable, as was shown by their utter inability to see in their dolls anything but what they felt or desired about them. This confusion begins to clear up after five or six, but the stronger impulse to attribute to everything else the child's own feelings, or animism, is still present at seven and falls away only slowly till adolescence. The child seems to be as thoroughly animistic as a savage could be in present environment, as practically all the studies of children show. That the child personifies everything and is so imaginative, Sully shows, does not prevent him from having even at the same time a strong, but very fluctuating, power of observation. Correct and full observation, however, is a slow growth. At this period of life children are in an almost hypnotic state of suggestibility, as is shown by Baldwin,² Small³ and others.

Darwin,⁴ Preyer,⁵ Perez,⁶ Sully,⁷ Lombroso,⁸ Compayré⁹ Hall, and Burk, have shown the many animal and savage characteristics of young children, such as their utter selfishness, lack of regard for others' feelings, their teasing and bullying propensities, fears, superstitions, lack of regard for truth, mimicry, lack of correct idea of death, even their sympathy and pity are largely imitations and are well paralleled in animal and savage life.

Miss Sissons¹⁰ noted that of all the spontaneous school yard plays of kindergarten children, the dramatic and representative plays and those having great physical action were predominant. In the tremendous role that imitation plays in children Miss

¹ On imagination, see W. H. Burnham, "Individual Differences in the Imagination of Children." *PED. SEM.*, II, 2. Also, F. Queyrat, *Le Imagination et ses variétés chez l'enfant*.

² Mark Baldwin, *Mental Development in the Child and the Race*.

³ Maurice H. Small, "The Suggestibility of Children." *PED. SEM.*, IV, 2.

⁴ Charles Darwin, *The Expression of the Emotions in Man and Animals*.

⁵ Preyer, *The Infant Mind, and The Mind of the Child*.

⁶ Perez, *The First Three Years of Childhood*.

⁷ Sully, *Studies of Childhood*.

⁸ Lombroso, *L'Homme Criminel*. "Criminal Instincts are general in children."

⁹ Compayré, "L'Evolution de L'Enfant."

¹⁰ Genevra Sissons "Children's Plays." *Studies in Ed.*, p. 172.

Frear¹ noted that they loved specially to imitate adult activities rather than adult words.

The colors preferred by young children are the strong ones, and the more violent contrasts are the most pleasing. They show little, if any, appreciation of real art, preferring decidedly the common colored reproductions to the most artistic black and white originals.²

The productive art instinct awakens very early, and recent study shows it to be, as Froebel said, a continuation of gesture. After the early scribble stage it passes very soon into the symbolic and representative stages; children showing more interest in the art production than appreciation for art till about the eighth year, when Lukens³ finds much evidence that the interest in the study of art or observation of artistic production forges ahead and the early interest in production is lost. This falling off of interest in production may be permanent, but if not, it remains far below the interest in observation and appreciation of artistic productions till well into the period of adolescence.

The child's interest in causality⁴ is awakened very early, being present in all children examined before three years of age, the boys being more precocious and persistent than the girls. Their questions of "why" are most frequently about natural phenomena, motion, animals, and religious subjects. Practically all children show a religious interest before seven years of age.

Binet, Barnes and Shaw found that almost the only interest which young children have for objects is in their use and action, with little or no interest in their substance or qualities. After this period they gradually get interested more in the activity and motion, and then in what it is made of. Barnes found that interest in classification is very small till seven, rises slowly till ten and rapidly then till it reaches adult proportions by fifteen years.⁵

Sully, Mrs. Barnes, Brown,⁶ in fact, all students of children,

¹ Caroline Frear, "Imitation, A Study Based on E. H. Russel's Child Observations." *PED. SEM.*, IV, 3.

² M. V. O'Shea, "Interests in Childhood." *Child Study Monthly*, Oct. 1896. Baldwin found blue to be the favorite color, but his method was faulty. Most observers give yellow as the earliest favorite.

³ See foot note 5, p. 185; also M. V. O'Shea in *Proc. N. E. A.*, 1894, p. 1015.

⁴ See Sully, also Anna L. Davis, "On Children's Interest in the Causal Idea." *Child Study Monthly*, Sept., 1896.

⁵ Alfred Binet, "Perception d'enfant." *Revue Philosophique*, 1890. Earl Barnes, "A Study of Children's Interests." *Studies in Ed.* p. 203, ff. Edward R. Shaw, "A Comparative Study on Children's Interests." *Child Study Monthly*, 1896.

⁶ Elmer E. Brown, "The Child's Interest in Historical Biography and Narrative." *Journal of Ed.*, Feb. 7, 1895.

agree that the preponderating literary interest of young children is in fairy and folk-lore stories, which lasts with at least half the children till ten years of age, when it rapidly declines almost to extinction by the thirteenth year, with a possible rejuvenation later from another standpoint. Miss Vostrovsky,¹ in a special study, found love lore not mentioned till the tenth year, and at this same period the children suddenly grow critical and lose interest in the fairy stories. Brown found that for California children legendary heroes, pioneers, and heroes in history, awakened little interest till the eleventh or twelfth year, when they were the predominating interest. In a study of favorite books of children at various ages Mr. John C. Shaw found the following to be the five most generally liked, given in order of preference: 3d grade, Grimm's Fairy Tales, Alice in Wonderland, Black Beauty, Andersen's Fairy Tales, Five Little Peppers; 7th grade, Scottish Chiefs, Rose in Bloom, With Clive in India, Six Girls, Huckleberry Finn; 2d yr. High School, Donovan, Ramona, Scarlet Letter, Prince of India, Rob Roy. Lancaster² found in his study of adolescence the following authors preferred at that period, given in order of preference: Poets—Longfellow, Tennyson, Whittier, Shakespere, Holmes, Bryant, Mrs. Browning; Novelists—Scott, Dickens, Alcott, Eliot, Hawthorne, Roe, Stowe, Cooper. Both these studies are too limited for scientific generalization, and the spontaneity of the reports of the children is interfered with because certain of these works are taught now in so many schools; but taken with other works in child-study their import is plain.

Of stories interesting to young children, Miss Vostrovsky found them most interested in the early period in the action and the names, while feelings, sentiments, aesthetic details and moral distinctions fill a small place. Stories with the particular human interests were preferred and specially those about children.³ Miss Holbrook reached similar results, through study of things read by children.⁴ In this the decided presence of the feeling

¹ Clara Vostrovsky, "A Study of Children's Superstitions." *Studies in Ed.*, p. 123, ff.

² E. G. Lancaster, *The Psychology and Pedagogy of Adolescence*. *PED. SEM.*, V, 1.

³ Clara Vostrovsky, "A Study of Children's Own Stories." *Studies in Ed.*, p. 15, ff.

⁴ Agnes Sinclair Holbrook, "Study in Reminiscence." *Studies in Ed.* p. 58, ff. Pathos with a gladness of relief were the emotions mentioned most often. Evening appeared the most impressionable time, often with the open crackling fire and silence at the time mentioned. Colored illustrations also were conspicuous in memory. The animal Bible stories such as Jonah and Daniel were favorites. Almost no reading-book stories were mentioned. Book titles and persons' names were among the most prominent things remembered.

or emotional element is noticed, which certainly is more in accord with the writer's general observation than Miss Vos-trovsky's result indicating that feelings played a small part with young children.

In study of historical interest, Mrs. Barnes,¹ and, in an independent study, Miss Köhler² found that it first centered around strong lines of action, a clear presentation of names and places and the relations of cause and effect, and a desire for a truthful record. The last was, however, entirely uncritical, the personal authority of the teacher being all that was desired. Little care was given to the time, the ethical element or expansion of detail. The early interest was largely personal, centering in families and heroes. The larger social interest was not found till the twelfth year, when it rose very rapidly and along with it a strong critical spirit and interest, which till then is lacking. The change to interest in social life and in the search of sources for truth is as decided here at puberty as we will see later it is in religious development.

The power to draw inference, while not found entirely absent at any period examined, was very slowly developed and still weak till the twelfth or thirteenth year when it developed strongly into legitimate and imaginative inference.

Street reports experiments which indicate that children acquire a foreign language more rapidly from eight to twelve than at any other period of life.³ Shaw found that of 700 Worcester school children examined, the memory reached its maximum very early, boys by the ninth and girls by the seventh year of the grammar school.⁴

A compilation of the works of Hall,⁵ Barnes,⁶ Sully,⁷ Burnham,⁸ Daniels,⁹ Ellis,¹⁰ Starbuck,¹¹ and others, indicates that in theological matters children below six usually accept everything told them without question, only translating all of our adult explanations into terms of their own little experience. The spirit world being another home and playground above the

¹ Mary Sheldon Barnes, "The Historic Sense Among Children." *Studies in Ed.*, p. 43, ff.

² Anna Köhler. "Studies in Historical Methods," by M. S. Barnes. Boston, 1896, p. 81.

³ J. C. Street, "A Study in Language Teaching." *PED. SEM.*, IV, 3.

⁴ John C. Shaw, "Memory in School Children." *PED. SEM.*, IV, 1.

⁵ G. Stanley Hall, "The Contents of Children's Minds." *PED. SEM.*, I, 2. Also reprint in book form by E. L. Kellogg & Co., New York.

⁶ Earl Barnes, "Sex in Education," and "The Theological Life of a California Child." *PED. SEM.*, II.

⁷ W. H. Burnham, "A Study of Adolescence." *PED. SEM.*, I, 2.

⁸ A. H. Daniels, "The New Life." *Am. Jour. of Psychology*, VI, 1.

⁹ A. Caswell Ellis, "The Sunday School." *PED. SEM.*, III, 3.

¹⁰ Edwin D. Starbuck, "A Study of Conversion." *Am. Jour. of Psychology*, VIII, 2.

sky with dollies and pets. Very few and vague questions arise from seven till ten when they begin to criticise and question. This increases now rapidly, reaching its maximum intensity at about fourteen, and declining slowly from that time. The period of adolescence is, however, the period of the greatest religious interest, and the strongest theological convictions are felt from about twelve to fourteen or sixteen. After this, doubts assail strongly and the youths struggle in attempt to harmonize science and religion.

Closely connected with the religious development is that from selfishness to altruism. Young children are all by nature almost completely selfish; from six to twelve a few are unselfish, while all normally improve; but adolescence is marked by a remarkable awakening of unselfishness, a rise of philanthropic ambitions and general social and altruistic impulses,¹ girls leading boys at all ages, except probably at about thirteen.² These natural altruistic and social instincts may, however, be completely inverted and adolescence develop an intense selfishness, a morbid hatred of all society, or a great love of bullying and teasing, which is quite common also in a much younger age, as Burk shows.³ Dawson⁴ finds that most criminals in American schools and prisons are found to have begun their career before twenty years of age, and that a large per cent. of the children in the reform schools, very many of whom are adolescents, are sent there on account of stubbornness, or refusal to submit to the usual controlling authority.

Barnes,⁵ Miss Darrah,⁶ Miss Schallenberger,⁷ Miss Frear,⁸ Snedden,⁹ all approaching the subject in different ways with varying experiments found that children under six or seven have little, if any, appreciation of general laws, but consider personal commands binding, and regard punishment as an arbitrary, individual matter imposed without reference to the social order. They do not themselves discriminate degrees of offences, but

¹ Alma Patterson, "Children's Motives." *Studies in Ed.*, p. 252, ff. "Children's Hopes," *Rep. State Supt. of Pub. Inst., N. Y.*, 1896, p. 1007-8. In this study only three or four out of 2,000 mentioned religious hopes till twelve; the consideration of death was not seen either till twelve.

² Hattie Mason Willard, "Children's Ambitions." *Studies in Ed.*, p. 243, ff.

³ Frederick L. Burk, "Teasing and Bullying." *PED. SEM.*, IV, 3.

⁴ Geo. E. Dawson, an unpublished manuscript.

⁵ Earl Barnes, "Discipline." *Studies in Ed.*, p. 366, and other places.

⁶ Estelle M. Darrah, "Children's Attitude toward Law." *Studies in Ed.*, p. 213 and 254.

⁷ Margaret E. Schallenberger. *PED. SEM.*, III, 1.

⁸ Caroline Frear, "Class Punishment." *Studies in Ed.*, p. 332.

⁹ David S. Snedden, "Children's Attitude toward Punishment for Weak Time Sense." *Studies in Ed.*, p. 344.

punish arbitrarily and severely, more with a vindictive notion of "getting even" than with any moral purpose. Street¹ reports that, of two hundred persons studied by him, moral action with younger children seemed more a matter of imitation, and that conscience plays a very small role till after nine years of age and little then till about thirteen. Young children have vague notions or feelings of outrage, or of satisfaction, without knowing exactly why. They submit to arbitrary punishment more willingly now, but less and less so as age advances. Sully says that young children object to all law as implying a restraint on free action. This condition grows more rational very slowly till about the eleventh year, when a great increase in regard for law springs up and develops rapidly, till at sixteen (the highest age studied) seventy-five per cent. of all recognized well its binding force. The child begins now to know what he feels, to recognize the social order, to appreciate the purpose and remedial value of punishment, to punish less severely and more rationally, taking into account somewhat the intentions of the culprit.

Though very indefinitely and incompletely, something of the same order of development was noticed in examining the reports of punishments of dolls by children at different ages.

Clouston, Burnham, Lancaster, all those who have studied adolescence impress upon us the revolutionary character of this period. Here the social and ethical impulses spring to the front.² As at the first physical birth the lower animal feelings and instincts, and the special senses are born and develop rapidly to maturity, so at the second birth of adolescence the nobler social and religious feelings, the higher critical and rational faculties are born into the human soul. At this period the emotional activity is intense, often to a morbid despondency or unreasoning joy. The love of nature is strong — not a scientific love of it, but for the quiet, solitary communings. This arises apparently from an intense desire for sympathy. For the same reason, apparently, boys at this period so often love women very much older than themselves. They seem to feel a broader life stirring within them and to grope around in all directions to satisfy this yearning. Lancaster reports that this is a period of interest in music and art, with a strong tendency to philosophize. Impulses spring up here in all directions, expressing themselves now in intense love of the opposite sex, now in fierce religious fervor, or in desires or attempts to do great things, to straighten out or right the order of the universe, to do great acts

¹ J. R. Street, "A Study in Moral Education" *PED. SEM.*, V, 1.

² See also "Children's Hopes," by Taylor, Rep. State Supt. of Pub. Inst., N. Y., 1896, p. 1006, ff.

of heroism, or deeds of philanthropy. There seems to be nothing beyond the reach of the wild surging of an adolescent's brain, and future life never rises higher than the level here attained. In this period are glimpsed all the great ideals which direct the whole life, and adult life might be termed the period for picking out and developing some one or more of the vague ideals, aspirations, hopes, of adolescence.

After looking at these facts indicating the several radically differing phases of human development, one must see that any system of pedagogy that does not make the child's development the fundamental fact in the determination of culture material and method of procedure in education cannot hope to escape trampling upon or starving the most precious buds of the developing human being.

The human soul is seen to be too complex, possess too many differing phases of development to be met at all periods of life by any present form or method or system of education.

To be sure, no hard and fast lines, or particular ages of life mark off these periods, and certainly the experiments thus far made are crude in the extreme and often thoroughly unsatisfactory; but all of them together do make it safe for us to say, roughly, even in this, the infancy of child study, that these periods are passed through in this order and with these changes. That far greater clearness and deeper insight will be gained by the combined work of the next few years is a safe and reasonable hope. Child-study is in the period of search for proper methods of working; the data already on hand have cleared the way enough to show what are some of its problems and what sort of questions we must ask nature in our experiments. To get such questions clearly outlined has ever been the first *desideratum* for an advance in science.

Meaning of these Periods. What these periods of development mean for education is a problem that philosophy has forced upon it now as never before.

The greatest problem of all presented by these periods is the relation in the unconscious between these successive stages of development. In the intra-uterine period the embryo is, so far as we can say, entirely unconscious, and the special sense organs and cortical areas do not function at all; yet such a force is generated, or gathered up, in this period that in a few days after birth this whole system comes into function. That all the forces necessary for the rapid development of the first months of life should be generated after birth is incredible. It is well known, too, that malnutrition, improper stimulation, shock during gestation, or accidents at delivery, may any of them produce most profound effects upon the sense life to be developed in the first few years after birth.

Just so, in that second period of childhood, from seven to eleven, the body growth has stopped, the brain growth is nearly at a standstill, and the higher emotional, altruistic and critically rational life has scarcely begun to function—the few scattered cases of apparent function being hardly more than comparable to the reflex or imitative intra-uterine reactions of the embryo ; yet a burst of physical energy and flood of new emotional and intellectual activity show themselves in such rapidity at puberty that the space of one year may transform the whole mental and physical organism. The question is forced upon us then, where does all this force come from, which so suddenly and powerfully surges up at puberty ? Can it all be generated during this brief period, or has the organism been gradually accumulating it during all that long period of retarded growth ? Do not the forces which break forth at adolescence in new physical functions and higher emotional activity slowly and unconsciously gather during that period of dead-level from seven till eleven, just as the forces for the growth of consciousness and special senses gather during the intra-uterine period ? Is there any particular causal relation between the activities of the senses and muscles from seven till eleven and the later higher psychic activities ? In what form are those forces that are to come forth later stored away in this period ? Under what embryonic forms are the rudiments to appear now that will stimulate the later deep emotion and broad reason ? Are the abstractions of later life first developed in the form of symbols, as Froebel believed, and must the child first possess this symbolic form and feed his soul on that to develop this unconscious potentiality for abstract thought up to consciousness at adolescence ? Anthropology shows that symbols have played a vast role in the growth of thought in the human race. Froebel's mathematical symbolism certainly seems, however, to have few facts in psychology or anthropology to sustain it ; but may there not be a larger and broader symbolism of nature that plays a part in education we little dream of as yet. The psychic powers cannot spring forth full developed from nothing into consciousness. All nature tells us that there must be some preceding, intermediate state out of which they grow.

Education has got to get back of clear consciousness into rudimentary and germinal forms to find what they are and how they are fostered. The feelings, the instincts are the great reservoir from which all ultimately comes, and if we ever intend to be more than mere conjurors and parlor magic workers we must go into this laboratory of soul and see how nature prepares those highly organized compounds of consciousness that are thus at certain seasons thrown out in overwhelming confusion. Until that is done education is a gross empiricism and at best

largely guess work. The study of adolescence has received some careful attention, and though much is left to learn, we do know something of its chief features. Of that period from seven till eleven practically nothing is known. This is now one of the greatest needs in pedagogical psychology. It is impossible to get the full meaning of the earlier period or to understand adolescence till we know what the one results in and what produces the other. If analogy is of any value for prophecy, it will probably be found that the rudimentary form of the adolescent psychoses are not similar at all in form to the developed product. To apply this concretely, that forcing upon young children broken doses of love, love and society of the opposite sex will not at all hasten the development of a healthy adolescent love; or, that certain juvenile courses in nature-study may even delay or abort the adolescent love, sympathy and feeling of union with nature—and so with religion, science, etc. This whole matter bids fair now to turn out to be a food problem. Take, for instance, the catechism in early religious training. Is not the use of that somewhat as it would be if one discovered that the body was made of oxygen, hydrogen, nitrogen, etc., in certain proportions and amounts, and then took exactly those same proportions and amounts of pure oxygen, hydrogen, etc., and fed them raw to the child? All things now point in pedagogy to the fact that we must take more fully into consideration the digestive and transforming power of the receiving mind. We know what is given to the child, as yet we don't know what he transforms it into before thorough mental digestion takes place. So far as consciousness is concerned, we can see no possible connection between the mental stimuli given the child in the intra-uterine period and those powers that he possesses just after birth. He has been simply taking nourishment through the umbilical cord, and upon this process depends the ripening of those powers of sense. The puppy confined in perfect darkness, away from every sight stimulation, and kept well fed, had his eyes to open and sight to come at the proper time.¹ What now are the rudimentary stages of the special senses in intra-uterine existence, and what stimulation do they need? No one would say that their development would be helped and not greatly endangered at this period by the sense stimulation of later post natal life. There seems to exist a sort of food relation here that is not well understood. So with the activity of that period just before adolescence, it seems probable that the relation which it will sustain to adolescence is this same food relation. It will be seen that it is not at all

¹ H. Held, "Ueber Experimentelle Reifung des Nervenmarkes," Archiv. of Anat. u. Entwicklungsgeschichte. Leipsic, 1896. p. 222.

the plan of nature to prepare the way for the later activity by giving a simple form or broken dose of this activity for a long previous period, but by feeding the organism on such food as it demands and has organs to receive at this particular stage of its development — preparing for the sense activity by feeding the physical embryo on blood, preparing for the higher emotions and co-ordinations of thought of adolescence, by feeding the child upon the somewhat animal emotions and sensuous and muscular activities of the earlier period of natural youth.

If this is what Froebel meant in saying that the full and complete development of one period is the best possible preparation for the succeeding period, then he took his position like a biologist and philosopher, but he applied it like a mystic.

In the present condition of psychology such problems are open to us as they never were before, but much work is yet to be done before any but a speculative answer can be given.

Period from Seven to Eleven. Concerning that enigmatical period of retarded development from about seven till eleven one fact does seem to be quite certain: that is, that it is the period for language teaching. By referring to the diseases of the former period it will be seen that the speech organs have just completed their growth and hence are still somewhat plastic, though ready for work. It is also shown that during this period the verbal memory is good, reaching maximum power about its end, while children now are particularly interested in names. The higher emotional and co-ordinative power and interests of adolescence are not needed to learn words, declensions, and conjugations; so that it is but natural that this should be found, as it has been, the period of greatest facility in learning a foreign language. That intensive study of language should come here seems certain.

That this is also the period for the co-ordination of the muscular movements is a patent fact of physiology. The intense interest in plays¹ and the irrepressible movements, the lack of ability to long concentrate attention on intellectual work, their love of manual exercises² all indicate that in this period should

¹ Mr. T. R. Crosswell finds in a study he is making, including about 5,000 children, that 8 to 13 are years of great interest in the traditional games, such as tag, ball, etc., —ten and eleven being the years of greatest interest. The same is true of the running games, while the love of toys and imitative games comes earlier, and that of such games as cards comes later.

² J. P. Taylor ("Children's Hopes," Rep. State Supt. Pub. Inst. N. Y., 1896, p. 1000,) found that of 2,000 children examined the trades were most popular at 7, 8, and 9. "The fact that an occupation deals with tools, plants, or animals, that it means peculiar power over one's fellows, that it gives one a distinguished air and requires something of heroism makes it appeal most strongly to the younger boys."

be begun those manual and artistic studies that require peculiar or delicate muscular co-ordination later in life.

The Early Period. What should be done in that first period of rapid growth is doubtful. Here the senses are to be trained, surely; but whether otherwise the period should not be left to digestion and growth, by following almost any line of spontaneous interest is an open question. The adult teachers are so far removed from the condition of mind of this period that they cannot appreciate it, as they may the later periods, by means of their own reminiscences; and so little is really known of the child's capacities and needs at this time that any *rigid, adult-devised* system from present data seems as liable to harm as to help the child. The safest hope appears to be to trust nature and let children follow largely their own interests, but when we consider their almost hypnotic state of suggestibility it will be seen that this is well-nigh impossible unless the adult exercises considerable care in getting out of the child's way. The further discussion of this is not in place here, nor a very satisfactory settlement on scientific grounds possible from present data. What could be said was given in discussing Froebel.

Adolescence. At the great psychic new birth at adolescence it cannot be doubted that the new forces set free must have fit material to which to apply themselves, lest they become attached to what is unworthy — here the boy should have something better than partial payments and Latin roots; he should study into such larger views of life, and nature and religion as are shown in biology, sociology, history, science, literature, etc. Street¹ found from ten to fifteen to be the period when most children studied by him noted the great influence of a companion or teacher in shaping their moral character.

The intense energy and activity of adolescence demand many and large interests, and if education fails to satisfy these, the force expends itself in dangerous or morbid channels. How this energy is conserved and what interests are established here will determine the future life.

"Core" of Study. Many other minor points are to be gathered from what data are already collected, but these are only a beginning of what the next few years should furnish. The supreme importance of these periods, and their controlling influence in any rational course of study, can no longer be doubted. From this point of view all notions of the Herbartians about a "core" or "cores" of studies must be transformed. The "core" of study must shift with the varying cores of interest and capacity, as they arise in different stages of the natural order of psychic development. There should be no more danger

¹ J. R. Street, "Moral Education." PED. SEM., V, 1.

to mental unity and sanity in this than there is to bodily unity in the developing of some senses and organs years before others. The laws of organic growth are far too subtle to be included within mathematical psychology.

Nascent Periods. These facts prepare the way now for a discussion of the "nascent periods" of psychic development. The chemist knows that just at the point of being set free from its old combination an element may take up more of another given element than it ever can afterward; nascent oxygen, for instance, can take more hydrogen than can ordinary pure oxygen. In physical growth the period of greatest growth in function is birth. All the organs for breathing, eating and extra-uterine life are present for some time before, but suddenly they begin an activity that is tremendous as compared with their previous condition. Food and air now are all important, never again will such large returns result from such small outlay of nutriment. Slight starvation now may mean death. Small neglect or maltreatment now are more serious than they are ever afterwards. Similarly, at the nascent period of puberty proper or improper treatment of the organs then developing has its most powerful effect for good or evil.

In the cultivation of psychic powers, the same importance seems to be attached to their nascent period. If the special senses are not trained in childhood it is impossible to acquire the highest skill later. The emotional and aesthetic faculties must be developed before the passing of adolescence or they never reach perfection. Lancaster¹ found the average age at which great actors, poets and artists did their first famous work was below nineteen, while the great musicians have become noted before ten years of age, pioneers by eighteen and missionaries before twenty-three. The physical and manual training teachers generally claim that it is impossible to ever after gain perfection as wood carvers, gymnasts, etc., if the period of early muscle and nerve growth and co-ordination before and during early adolescence is neglected. There seems to attach a certain plasticity and also a momentum to early stages of any growth that offer opportunity to the educator such as no other period does. Little work of value has yet been done to see, either when these nascent mental periods for different culture subjects are on, or to indicate by what the educator may be guided in attempting to seize all these at the period of maximum capacity for growth.

The safest and only guide now offered is the child's own in-

¹ Dr. Lancaster studied the lives of 100 noted actors, 50 poets, 50 artists, 100 musicians, 100 pioneers, and 50 missionaries. See note 3, p. 171.

terest. Interest is nature's declaration that here is something which fills a want felt in the organism. A few random questions or hysterical kind of enthusiasm, due generally to suggestion or imitation in following a teacher in class, do not indicate anything of the kind or any real interest. And when intelligent men speak of following interests as if opposed to work and to doing all unpleasant tasks, and as if it meant vibrating with every flitting fancy of the child brain, they really appear not to understand what "following interests" means. It is a physical and mental impossibility to follow all interests; but it flies in the face of nature and tramples science under foot to attempt to teach anything for which the child has then no interest. It will be seen under the discussion of "rudimentary organs" that many interests of the child need as careful weeding out as others do fostering; but interest must mean some degree of physical and apperceptive ripeness for the given subject, for how can one be interested in what he knows nothing about. Physiology shows that interest means a quicker pulse and full blood supply to the whole central system.¹ Hodge's work on fatigue shows that no amount of external uninteresting stimulation can tear the nerve cells down with activity as will the normal interests of the daily work of those animals in gathering food.² Psychology and child-study have yet much to furnish pedagogy in pointing out the normal interests of each period of life, and the proper method of developing them without causing stagnation from too early satiety on the one hand, or, on the other hand, losing the precious moment of maximum capacity for growth by an early starvation. Herbart first showed the real value of a many-sided interest, but it is left for modern pedagogy to find what these interests are and when and how they develop. His idea of grafting them on, and his "formal steps" by which to develop them, do not cover what the study of heredity, instinct and feeling have shown since, and it seems probable now that even these much loved and more abused "steps," will have to give way, or at least give over many passengers to other more instinctive, less conscious and less logical means of entrance into the mind. Just what these new steps, or what the apparent variety of steps are, is yet too subtle a problem for present data.

Periods of Arrest. Connected probably closely with the inevitable rhythm of the ebb and flow of interest, and just the obverse side, or compliment, of the nascent periods are the periods of decided decrease in rate of progress, or total standstill

¹ H. H. Donaldson, *The Growth of the Brain*, p. 356.

² C. F. Hodge, "A Microscopical Study of Changes Due to Functional Activity in Nerve Cells." (Boston, 1892), *Journal of Morphology*, Vol. VII, No. 2.

in the process of mastery of any subject. This common experience all have had of beginning some new subject, such as a new language, or athletic exercise and making very rapid progress for a while and then ceasing to improve further, no matter how hard one tries, till a rest is taken or some extra stimulus spurs us to an unusual exertion, when the progress begins again as suddenly as it ceased and rapid improvement is made for another period. Only recently has this matter been studied experimentally, and yet only slightly. Physiological rhythms have been found in practically all physical functions,¹ and the parallelism usually found between bodily and mental phenomena should long ago have set education to work on this problem. Brooks² shows that in the segmentation of eggs the progress is not at all even, but consists of periods of apparent rest followed by periods of great activity. Donaldson³ says of the brain that growth is never general, but accentuated, now at one spot, now at another. All of this gives increased significance to the work of Bryan and Harter,⁴ which showed that in learning both to send and to receive the telegraphic symbols the rate of progress went by jerks, and with each student there was a long period of lessened rate of improvement, or no improvement at all, between the rapid rise of the first few weeks of practice and the final rise that gave sufficient facility to do "main line" work. The continuation of the usual exercise per day failed to cause any improvement in work during this rather constant period of no advance till, from no apparent reason, the progress began again; or in some cases the subjects staid at the first period of no improvement for years, seeming to be unable to advance to the required rate for "main line" work, but under extra pressure from the stimulus of threatened loss of job would make an unusual effort and begin at once to improve, when a period of rapid progress followed till a maximum was reached much above "main line" rate.

In writing and drawing and learning to speak, Lukens⁵ has

¹ Michael Foster, *Physiology*.

² W. K. Brooks, *Studies in Biological Laboratory*, Johns Hopkins University, Vol. II, 1882.

³ H. H. Donaldson, *the Growth of the Brain*, p. 357.

⁴ William L. Bryan, and Noble Harter, "Studies in the Telegraphic Language," *Psychological Review*, January, 1897.

⁵ H. T. Lukens, *PED. SEM.*, Oct., '96, and May, '96. Dr. Lukens has since consulted such experienced teachers as Prof. Miller, of Penn. Mus. and Sch. of Ind. Arts, Supt. Daniels, of Chicopee, Mass., Miss Stoker, of St. Paul, Miss Locke, of Chicago, all of whom have noticed the very striking periodicity mentioned in learning drawing; while a number of professional penmen consulted stated that there was a critical period for practice in penmanship about the time of the outcrop of individuality in writing. The writer is indebted to Dr. Lukens for suggestions, both in his lectures at Clark and in a private letter on this subject.

found similar fluctuations. Clark¹ and Barnes² give the same report for drawing. Starbuck³ finds such a periodicity in ethical development; Phillips⁴ is finding evidence for the same thing in the study of arithmetic; Street⁵ in language and in moral culture. Whether this phenomenon is due to a normal and inevitable fluctuation in interest and consequent power of attention and effort, caused by the natural rise of other differing interests; or it is based upon some neurological considerations, such as a need of time for the new association fibres stimulated by the new study to get their sheaths fully developed, and the large number of new co-ordinations to get worked over together until they become largely reflex and leave consciousness unburdened longer with them to follow on after new co-ordinations, these are questions of immense significance for pedagogy. A comparison of this with the study of the phenomena of "second breath,"⁶ and of conversion,⁷ would seem to make it sure that it is short, intense effort which does the great work in education.

Bryan says, however, that unless the normal effort has been kept up faithfully during the long period of no improvement the final period of intense effort will not cause the decided rise in facility in learning telegraphy. This is of great importance, if true, and greater importance if untrue. The writer does not think that control experiments were used sufficiently to give this part of the work proper scientific value. Personal experience in many forms of athletics, and somewhat extended, though unscientific observation, also, lead the writer to believe that in that period of pause in improvement intense and persistent effort is a waste; and that comparative rest, or direction of attention to another exercise, with only enough of the usual work being done to prevent getting out of practice, will give the same result of rapid improvement upon the application of the intense effort again at near the end of the natural period of inability to improve. If scientific experiments prove this true, it is of the greatest importance in the arrangement of the school curriculum. It is a problem that needs and will probably soon have further conclusive study.

These and other facts suggesting the superior power of intense, concentrated, persistent effort over a limited period of

¹ John S. Clark, Ed. Review, (N. Y.) Jan'y, '97.

² Earl Barnes, Studies in Ed.

³ Edwin D. Starbuck, "A Study of Conversion," *American Journal of Psychology*, VIII, 2, and later studies yet unpublished.

⁴ D. E. Phillips, *Am. Jour. of Psychology*, VIII, 4.

⁵ J. R. Street, *PED. SEM.* V, 1.

⁶ G. E. Partridge, "Second Breath," *PED. SEM.*, IV, 3.

⁷ Jas. H. Leuba, *A Study in the Psychology of Religious Phenomena*. *Am. Jour. of Psychology*, VII, 3. Edwin D. Starbuck, "A Study in Conversion," *Am. Jour. of Psychology*, VIII, 2.

time, and the work of Bergström¹ and Müinsterburg showing the mental waste from interference of associations must soon make the present school curriculum and programme, consisting of a bewildering number of small, scrappy lessons in various subjects piled together each day, yield to periods of more concentrated and intensive study at one time of only a few related subjects.

Rudimentary Organs. As has now been seen on the one hand, that there are in man natural upward tendencies and capacities, which have their own law of development, and each its own peculiar period for coming into life, which should determine the school method and curriculum; so, too, it can be well shown that many downward tendencies crop out in man that are the hereditary legacy left to the organism by the long ages of primitive or animal ancestry. The appearance during the process of growth in a higher organism of physical or psychic characteristics belonging to a lower form in the line of evolutionary development is a common phenomenon, lately much discussed under the term "rudimentary organs." Comparative anatomy and embryology have long ago brought to light these rudimentary organs, belonging really to past ages but brought down in our present bodies, though of no apparent use, such as the semi-lunar fold at the internal angle of the eye, representing the third eyelid of the marsupials; the useless and often troublesome vermiform appendix, representing an enormous organ in the herbivora, "and in the koala attains a length three times that of the body;" the useless ear muscles; the pineal gland, now of unknown use, the remnant of a prominent body in the brain of lower animals, probably once a central, superior eye; the pituitary body, certainly rudimentary and probably representing the primitive mouth or a primitive sense organ of the ancestors of the vertebrata. In man there are now discovered many dozens of these rudimentary organs still present in the adult body; while in its various phases of growth the embryo presents a much larger number of ancestral traces, which pass away or are transformed before adult life is reached.² Thus the human embryo has, among other forms, that of the young of the fish with primitive gill slits, ventral yolk sac, etc., later passing into forms indistinguishable from the young of the lower vertebrates, and finally taking on distinctly human characteristics. The foetus presenting a rudimentary tail, rudi-

¹ John A. Bergström, "Experiments upon Physiological Memory by Means of the Interference of Association." *Am. Jour. of Psychology*, Vol. V, p. 356 ff.

² For fuller account of these rudimentary organs consult Wiedersheim, *The Structure of Man*; Ernst Haeckel, *Anthropogenie*; Paul Topinard, *Éléments d'Anthropologie Générale*.

mentary cervical and lumbar ribs and many other traces of distinctly lower types. Even at the fifth month it is covered with a coat of hair similar to the simian species. The incredible persistence of these ancestral tendencies can be seen when one recalls, for instance, that the process of elimination of the cervical and lumbar ribs began as low in the scale of development as the reptiles and fishes, a time too remote to be accurately estimated in years.

On the psychic side, the simple mental life of animals presents many interesting cases of remote inheritance of once useful but now useless traits, such as the enmity between cats and dogs (little kittens "spit" at the odor of a dog even before their eyes open)¹; the new born calf's fear of dogs; the habit of horses and dogs of turning around several times before lying down, even when on a smooth floor; the lapsing of many domesticated animals into a state of feral fierceness while eating, or during periods of sexual excitement; the covering of excreta by various animals, once probably a necessary means of protection against pursuit; the pawing of horses for food, probably inherited from the time when their ancestors had to paw away leaves or snow to find food; the return of the eels from the rivers to their old home in the sea when they are about to breed, and the similar return of salmon from the sea to their original river home during spawning season; the general tendency of both domesticated animals and of man to lapse to the wild condition when away from civilization. In adult man vagrant, predatory, and many other primitive instincts assert themselves continually even under the restrictions of civilization. It is in childhood, however, that the forces of heredity naturally assert themselves most strongly and present the animal and savage appetites and ideas common to children. Hall's work on the "Contents of Children's Minds," many of Barnes' papers mentioned previously, the work of Ellis and Hall on dolls, Suily's studies, Compayre's and Lombroso's books, and more recently Dawson's work on "Youthful Degeneracy," Burk's on "Teasing and Bullying" and specially Hall's work on fears,² show that the child's early psychic life is so filled with these rudimentary and reversionary types of activity that no theory save distant heredity can explain their presence. Whether this theory explains all these phenomena satisfactorily or not it is beyond the limits of this paper to discuss. This much appears certain; there are these rudimentary organs brought down in the body through incredible ages and there is

¹ Wesley Mills. Proc. and Trans. of the Roy. Soc. of Canada. Meeting of May, 1895, Sec. IV, p. 192.

² G. Stanley Hall, "A Study of Fears." *Am. Jour. Psychology*, VIII, 2.

no reason for denying to psychic characteristics a similar capacity for transmission, while, if we do not do this, the barbarous hectoring and bullying of children, their unnatural appetites and their senseless fears of feathers, insects, fur, etc., cannot be explained at all. That these rudimentary psychic organs, along with the rudimentary physical ones, are present can now hardly be denied. The questions for us as teachers are: first, what are the characteristics of the rudimentary activities; and second, how are they to be treated? The theologians and the school-men have said emphatically, "crush them upon first sight"—prune, lop off, trim down to adult standard has been the cry. But nature gives no evidence of dealing in this way with the body, and biology demands by what right we shall prune the soul. All improvement and growth in complexity of the body has been attained in evolution without the violent lopping off of a single cell. There the primitive organ was always transformed in form or function by slow growth, or was reabsorbed by the body and thus furnished an impetus to the new organ. The great and delicate organ of speech, the tongue, is simply a transformation and development of what was originally an organ of alimentation, the mammary glands are transformed sebaceous glands; the primitive *stratum corneum* is transformed into the shell of the terrapin, the scales of the fish, and later into the hair, nails and hoofs of the higher vertebrate, and finally into the hair and nails of man—passing during the growth of the human embryo of the present day through modified forms of these stages. Prehensile organs, such as the hands in man and mandibles for mastication in the orthopods are transformed organs of locomotion. On the other hand, the legs of the frog are dependent, first, upon the development and then the reabsorption of the tadpole's tail,—any injury to the development of the rudimentary tail delays or weakens the future legs or kills the animal. Biology furnishes numbers of these cases, showing the dependence of the adult form upon the proper development, and transformation or absorption of the earlier rudimentary forms.

In looking at the psychic development of man something similar is seen; the primitive sex instincts and psychoses have been partly transformed and given rise to the domestic and family relations, to gallantry, and often altruism; the savage fright and terror developed gradually into reasonable caution, modesty, awe, reverence; the violent anger of children at people develops later into moral indignation at injustice—and so it is with other forms.

In the light of these biological facts and of the present evidence in child-study it must soon be recognized that this lopping off process in education is robbery and murder—tearing

away the natural raw material of the soul which it is the educator's duty to transform, or to give these rudimentary psychic organs such a development that they will reach maturity in early years, be absorbed and give their strength to later and nobler growths. In this light of biology and child study, education is seen to contain far more delicate and intricate problems than adult psychology and past philosophers of education have any means for handling, and hence the great and only hope for advance in pedagogy lies, in the future, in the working out of these new lines lately so vigorously opened up. One can rest satisfied with any present system only by remaining ignorant of the results of the work of the last few years.

Biology has certainly one suggestion, and that is that these rudimentary forms must be well fed. Marshall¹ says that a plentiful supply of food yolk tends to hasten the embryo through the recapitulatory forms, or may even cause it to skip some; while the lack of food for the full development of even a rudimentary stage may fix the embryo forever in the rudimentary condition, as students of teratology maintain, and as the study of tadpoles would indicate.

Bring School Work more in Line with the other Unavoidable Educational Influences of Life. Another reform in education is sorely needed and progress along this line may soon be expected, that is in bringing the efforts of the school more into line with the other natural and unavoidable educational influences, such as heredity and the struggle for existence in daily life. When one recalls that such a student of instinct as Romanes grades the various instincts of the highest animals as high as twenty-three on a scale upon which normal man reaches only fifty, it can be seen what a broad and far-reaching heredity we have before considering the human race. The development of these instincts and of their human, later evolved offshoots, offers certainly the natural and easy path for education and should be the first work of the teacher. We should certainly go into co-partnership with nature when it can furnish half of our needed material already practically prepared.

As the engineer in laying his roads through the mountains always seeks out and follows the course of the streams, taking advantage of the well worn paths made by the flow of nature's forces along these lines for untold years, so must the educator seek out and utilize those neural or psychic paths along which there is an easier progress because of the hereditary imprint left by the passage of the forces of life this way through countless generations.

¹ Marshall. *Biological Lectures and Addresses, 1894. Lecture XIII.*

To bring together the best of the material now furnished upon the instincts and the training of animals by such careful workers as Darwin, Romanes, Wallace, Morgan, Mills, and others, and sift out the facts and principles shedding light or bearing upon human capacities and education is a work soon to be begun that will mark a new epoch in pedagogy. From this the kindergarten and early instruction should gain new life; for until the storm of adolescence begins to subside the instinct feelings bid fair to be proven by far the strongest factor in education.

In all probability this study of instinct will throw light upon the method of teaching by suggestion and hint, as opposed to such methodical hammering in as the "formal steps" and the usual Normal School pedagogy generally lead to. All of us, who ever really think at all, can remember instances in which a single question, an apt simile or a vague hint or hope, expressed perhaps in a public speech by some one, seized hold of our mind, set hundreds of new associations going, recurred ever and again as the days went by, each new fact giving it larger meaning till perhaps a whole new area was added to our mental life, gathered together by that one suggestion. Certainly these suggestions take hold, and will give no rest till followed out, only because they find material ready to receive them in the mind; and the possibility of their larger use in education rests upon a better knowledge of these dominant and moving mental appetites at different periods of life. If all the apperceptive material has to be consciously dragged up by the teacher and the interest awakened entirely by his efforts, that activity of suggestion which surmounts almost any obstacle and that mental hunger which devours any material give place to satiety and fatigue from dead effort of method. In the figure of Richter, to get the clearest note the hammer must just touch but never rest against the bell. Certainly no teacher or pupil could keep up this mode of teaching for five hours a day and in all the present school studies, but if a little more of it were used the five hours might be considerably reduced and part of the present wilderness of studies omitted.

The school work must also get into closer touch with the daily life of the child in the home, in the paths of business and upon the playground.

Play. The educational value of play has been much studied since Froebel's day, especially by the Italians.¹ The anthropologists have turned over to pedagogy large collections of the

¹ The best book is that of G. A. Colozza, "L Giuoco Nella Psicologia e Nella Pedagogia;" pp. 1-93, *Il Giuoco Nella Psicologia*; pp. 93-159, *Il Giuoco Nella Storia Della Pedagogia*; pp. 159-283, *Il Giuoco Nella Pedagogia*.

great folk-games of many of the races,¹ furnishing an invaluable basis for the systematization of such a curriculum of educational games and songs, that are really of interest to children, as will relieve much of the burden of education and reach many children in whom the present school work fails to awaken any response. Johnson² has made a valuable start in this direction, and has since shown by practical application at Andover that many of the mental qualities acquired by book study can be better acquired in plays and games, and that this stimulus may lead on to a new interest and success in the usual school work, as well as form a valuable aid to discipline.

In like manner, efforts are being made to carry further another of Froebel's suggestions and make the learning of various trades and occupations an educational influence and a connection between daily practical life and the school. Not the kind of work done in manual, trade, and technical schools, in which facility is the end aimed at and is acquired by continued repetition; but to teach one or more trades, not to give facility in work or even to make the trade of use, but to teach it only so far as it educates the mind or the muscles, changing to something else as soon as this point is reached and before sufficient practice is given to attain the great facility required in daily work. A study is needed of the various trades to find those of most educational value and that can be most easily adapted to school work.

Relation of the School and the Home. Every wise teacher looks with grave concern upon the widening gap between the school and the home. Parents are too willingly throwing the education and training of their children upon the hands of the State and the teachers. It is possible that under the peculiar circumstances of the time no other means could have accomplished so much; but a longer continuance of present conditions

¹ Among the many valuable books, those most available are perhaps: Wm. Wells Newell, "Games and Songs of American Children;" New York, 1884. (This contains a valuable bibliography of foreign works. For later papers and books consult Johnson's Article in *PED. SEM.*, III, 1.) *Children's Singing Games with the Tunes to which They are Sung.* Collected and edited by Alice B. Gomme. *The Traditional Games of England, Scotland and Ireland, with Tunes, Singing Rhymes and Methods of Playing.* Collected and Annotated by Alice Bertha Gomme. 2 vols. London, 1894. Since writing the above, Supt. Johnson's excellent article has appeared in the July, '97, *North Western Monthly*, giving a brief sketch of the development of play in pedagogy, and furnishing lists of games and a short working bibliography of the subject.

² G. E. Johnson, *PED. SEM.*, III, 1. For an account of Supt. Johnson's "Play School" I am indebted to Dr. Hall. A brief account is also given by Herman T. Lukens, "Child Study for Superintendents." Ed. Rev. (N. Y.), Feb., 1897.

will inevitably lead to a wider breach. The formative influence upon character which the Herbartians claim for the orderly development of the mind through the school studies is granted, but it is the home life and training which furnish that basis of character without which the school is helpless. Nothing can take the place of the home, as Aristotle long ago saw, no one can relieve the parental responsibility. Civilizations have ever risen or fallen with the health, strength and purity, or disease and disintegration of home life. If our present school system must continue to disintegrate the home life, it will be a curse to mankind.

Some attempts are being made to unite these forces by a sort of "university extension," and lecture work with parents in the village High Schools, making these schools a center of culture and social influence among parents, students, and teachers alike. Dörpfeldt's plan of the "Freie Schulgemeinde,"¹ using the family as a basis of school organization and making it to participate more both in the local management and responsibilities of the school, has many suggestions for the American leaders. To solve the problem of the proper relation of the home and the school is utterly beyond the capacity of the present writer, but nothing is more apparent than the fact that pedagogy must soon handle this question far more earnestly and seriously.²

The Correlation of Myth and Science. The larger correlation in teaching of the mythopic and instinctive with the scientific and intellectual views of nature, is now demanding attention from a new standpoint, because of the better knowledge of child nature and the strong belief in the existence of what I have

¹ Dörpfeldt. "Schulgemeinde;" also see the "Fundamentstück."

² Since writing the above my attention has been attracted by the efforts made to solve the above problem in Brookline, Mass., and the happy results of these. The work began in inviting the co-operation of the mothers with the primary teachers in the training of the younger children. The teachers and parents hold regular social meetings and discussions, at which each gets valuable information from the other, and parent and teacher form plans for mutual helpfulness in furthering the interests of each child. This work has spread upward in the schools to very great advantage. The Springfield High School is now following and improving part of the Brookline plan. Dr. Atkinson has very carefully prepared a list of questions asking for needed information from parents with regard to the health, appetite, hours for meals and sleep and study, tastes, reading habits, peculiarities or special capacities or deficiencies, likes, dislikes, interests, etc., etc., of each child. These reports are to be filed away together with similar reports from the grammar school masters, and are to be used in getting a better understanding of each student, so that he may be given a more just and rational treatment. These plans, only parts of which are here hinted at, are in the right direction and well deserve further investigation by every teacher.

termed merely a "food relation" between the culture material of one period of life and the mental states of higher stages. The large returns in knowledge and increased interest in nature, expected from the introduction of juvenile science into the grade schools, have failed to be realized. On every hand the report of the higher teachers is that the little smattering of science has not only failed to give children the accurate knowledge desired, but has often scared off the budding interest beyond possibility of revival in the serious later science work. This is a sore disappointment to pedagogy, in a direction where only hope seemed possible a few years ago. It is another illustration of the danger of applying the adult standard to children and of building *a priori* educational ideals, instead of first examining into the mental condition of the child to see what he wants and what he can handle. If we had known ten years ago what is now known of children, it could have been seen beforehand that they have little or no interest or apperceptive organ for scientific theories till well on into adolescence, that their reason, interest in original sources and scientific accuracy, power of making large inference, and critical judgment, eagerness to question and solve doubts of this kind do not rise till late, while the early school years are filled with an animistic appreciation of nature, with intense love of the usual mythopoeic and folk-conceptions. It is out of these conceptions in the race and not from the lack of them that science and philosophy have developed. A broad and deep background of myth has preceded and underlain every great national philosophy. The race unable to develop this myth in youth has failed to develop the philosophy and science in adult life. The question is then asked in all seriousness, if the later healthy growth of scientific interest is not starved in its embryonic period when the child is started with the strong food of pure science and not fed first upon the pap of nature myth and folk lore. Certain it is that studies of children show them, in spite of our efforts, often saturated with these notions and ever in sympathy with them. These myths represent the highest responses of the noblest minds of primitive ages to the forces of nature, and that they should awaken responsive chords in the child is but natural; and, however hard it is for us adults to see how these false notions open the heart and interest and lead the way later to opposite scientific views, there is every reason to believe this to be true. A propaedeutic course in nature myth and folk-tale, and a proper correlation of this with the later scientific teaching suited to adolescence and manhood is what may be expected of future pedagogy. There are, to be sure, many problems both in kinds of myths to be selected and the exact method of teaching them.

President Hall is now engaged in a practical effort to make

at least a provisional correlation of these two views of teaching, and education has much to hope for in the near future from this effort. The great difficulty is, of course, in making the connection at the transition period of life between these opposing views. Mr. Henry R. Baker, and I believe also Dr. Hall, think it possible to bring these two views along in life together, making it a matter of varying emphasis—in childhood, much stress upon the myth side and very little on the scientific; in adolescence, shade gradually over to the opposite emphasis. By this means it is hoped to let the childish unity and sympathy with nature, expressed by the myth, pass over without break into the later philosophic, monistic unity. Whether this riding two horses at the same time, going in opposite directions, or this keeping two registers open in the soul, is possible or desirable the writer gravely doubts. That the mythopoeic view is the natural and the healthy one for little children seems quite certain, if a full soul and broad sympathy are to be developed; but it seems impossible, if even desirable, for this to modulate over to the scientific view without the doubt, upheaval, swing to the other extreme, oscillation, the *via dolorosa*, and reconstruction at adolescence. Upon this subject a better study of adolescence will doubtless throw light.

Religious Training. Closely connected with the problem of the relation between the school and the home, and the relation of the mythopoeic and scientific views of nature is the question of religious training. The provisional arrangement, growing out of the abuses of religion and the other necessities of the time, by which religious training has been divorced from the schools and considered beyond the pale of pedagogical science, must soon give place to the inevitable demand of nature. However useful such a separation has been in bridging over periods of retrogression and bigotry in both religion and pedagogy, to permanently keep religious and secular education separated is doing violence to our souls and trying to tear apart what is by nature one. The old faculty psychology is gone, a brighter era of religious toleration seems near, and now pedagogy must accept and own her whole field and face its problem of religious education squarely. To yield it longer to the theologians or to Special Providence is a criminal shirking of duty.¹ The

¹ Nowhere else in the history of text-book making was there ever such an opportunity as is now offered to the International Sunday School Lesson Committee. With a guarantee that their books will be used by over twelve millions of students, and that each committee's work will cover at least seven years, the possibilities of good or evil are incalculable, and yet there is not a man on the committee of great reputation as a pedagogue or psychologist. This is not intended to reflect upon the ability of the eminent theologians who prepare these lessons, or to suggest that a committee should be appointed composed

writer made two years ago a laborious, but little availing, attempt to begin a systematic study of Sunday School work, and to apply to it the methods of scientific pedagogy.¹ Dr. Hervey,² President Hall, and perhaps others have recently done work along the same line. But to improve the work of Sunday Schools will not suffice. When one considers that the dominant influence in the life of every race has been its religion, that religion has for thousands of years among all races been the very center and goal of all education, that, in fact, education itself is primarily a product and development of primitive religious regimen and ceremonies—the first special education of the race being wholly religious training, and everywhere the school-master evolving from the medicine-man or priest—and that now, even in spite of neglect, religion is yet the central influence in all great lives—when these facts are recognized, it seems necessary that religious training again be replaced as a dominant factor in education. The world needs the heart and feeling, the enthusiasm and hope that religion alone can give. In bringing this back into the schools, many and grave problems arise. The miserable failure of the so-called "undenominational" religious training attempted in the English Board schools³ offers little hope of success to those efforts to eliminate from the Bible and religious instruction till no particle is left that is objectionable to any sect. The meagre fragments left of the corpse appear to please nobody and to be of little value to the children. The German plan of having selected ministers to call at specified times and instruct the pupils of their own denominations seems to work far better; but under any plan the grave questions of training the religious teachers, and of what and how to teach at the various periods of child growth are still to be solved by pedagogy. Studies of the religious development, though as yet only preliminary, indicate, as mentioned before, that under any sort of instruction children pass through widely differing phases of religious appreciation and development, which appear to demand a

entirely of pedagogues and psychologists; but I do think that to prepare so gigantic an educational scheme without the earnest and continued co-operation of leaders in education is ridiculous—or would be were it not so pathetic, if not criminal.

¹ A. Caswell Ellis. "The Sunday School Work and Bible Study in the Light of Modern Pedagogy." *PED. SEM.*, III, 3.

² Walter E. Hervey. "The Sunday Schools," *The Review of Reviews*, Dec., 1896.

³ For a brief account of this trouble see *Rep. Bu. of Ed. (U. S. A.)*, 1893-4, pp. 208-17: also the Educational Journals of England for the last few years; specially the *Nineteenth Century*, Nov. 1893, "Religion—at the London School Board;" and Dec. 1893, "The London School Board—a reply to Hon. Lyulph Stanly."

different kind of culture material and method of teaching. The full discussion cannot be entered here, but it suffices to say that in religion as in nature-study the process of growth must be better recognized. The mythopoeic and anthropomorphic conceptions in each field are those most intelligible to small children, arousing as nothing else does the interest and sympathies, and warming the heart, out of which, after all, come the issues of life. The same problem of the awakening and the change at adolescence is present here, as in the study of nature, though fraught with more serious consequences. It can hardly be doubted longer that the proper training in religion for young children is not a reduced juvenile form of the higher spiritual and philosophic religious conceptions of cultivated adults, for these are shown generally to awaken an utterly false response or none at all; but that young children should have the religious truths presented to them in the mythopoeic and anthropomorphic forms, which may undergo new interpretations in the child's soul as his growing natural capacity makes possible the rise from lower to higher conceptions of Deity and Divine laws. There are still the questions of what manner of teaching and of what myths have greatest forming power over the child's soul and at the same time prepare the way for the later growth, neither permanently moulding the soul to its primitive form nor throwing it into agnosticism when larger contradictory conceptions are reached.

As grave as are the problems presented by this method of teaching, they must be met; for educators to longer hold aloof or to refuse absolutely in the name of truth and science to teach young children thus, is to show no appreciation of the laws of nature's growth as seen everywhere, and to starve young religious natures. Children are shown the physical universe and allowed to believe what they are able, though we know they will see contours as flat shades and will have no appreciation of the principles of idealistic philosophy. Children, like men, can grow only by using the powers they already have, bumping their heads and learning better. Unless education prove recreant to her duty, the whole question of religious training will be soon rehandled boldly, though reverently, and some order brought out of the present chaos of superstition and sentimentalism on the one hand and on the other a hardly less serious ignorance and bigotry under the name of truth and science. Religion will soon be given its larger and truer scope. In the schools it will be recognized that religious training is interwoven with every study, not as the school men used to make mathematics teach the Trinity, but that every new truth has its religious bearings, if so taught as to warm our sympathy for nature and our love of God and man and develop a deeper

appreciation of the marvellous perfection of Divine laws and the true dignity and duties of life.

Specialization, both in studying and teaching, is forging to the front in recent years. Specialization in studies on the part of college students is already generally recognized as necessary for the best mental development. Aside from the fact that the enormous growth of all sciences now makes it impossible for one to get even a smattering of them all, if he should try, it is seen that nothing so makes for good mental habits, clear thought and sound scholarship as for a student to investigate one subject thoroughly from all sides till he is a master in this small field. Nothing else inspires and gives the student a healthy self-respect so much as to feel that on this point, however small, "he is an authority and not an echo." Since the introduction of the comparative method in all branches of study, practical experience shows that almost any specialty, if pursued to its natural and proper extent, will lead the student to a broad, general culture that is better mastered, can be better handled, and is of more real mental value to its possessor than the disconnected, superficial knowledge of the many subjects supposed to be necessary for general culture. This specialization is, of course, the necessary outcome of the movement in education demanding that a child be allowed to follow those lines of effort for which he is by nature best fitted. Interests of children are so fluctuating, their power of concentration for any long-continued, serious effort so small until after puberty, that it seems that specialization should not be attempted before that time; but during adolescence, when the interests, the likes and dislikes, the enthusiasms and energies are very intense for periods of moderate length, it seems that specialization along lines of strong interest should, by all means, be allowed in the high schools, and possibly in the last grammar grades, in order that those adolescent energies be not wasted or turned into morbid channels, and that the habit be fostered in the youth of doing serious, intense work in the pursuit of what appears to him to be a worthy problem. This will not at this age continue long on any one subject, and will not at all exclude general culture—indeed, rightly followed, the normal interests of a healthy boy would soon cover, perhaps, a larger and better field than do our present *curricula*.

Specialization on the part of teachers is becoming far more common, though serious objections to it arise. We now have separate teachers for music, drawing and penmanship, generally for physical and manual training, and occasionally for science, nature study, or modern languages. The introduction of these specialists seems on the whole to have resulted advantageously. How far this can be done successfully only experience will tell,

but whatever is claimed for specialization on the part of students applies to teachers, and whatever may be lost, and much certainly is, from the necessary lack of continued intimate contact with the pupils and knowledge of them by these teachers, seems more than balanced by their superior knowledge and enthusiasm, which can be possessed only by a specialist.

Physical Education. Among the numerous advances in education none strike deeper and are more potent for good than the practical recognition again that upon the cultivation of a sound body rests ultimately the whole superstructure of education. The works in pathology, criminology, physiology and neurology, specially in the study of the effects of fatigue and of various stimulants and foods upon brain cells and mental and physical activity, already offer to pedagogy many valuable suggestions and command numerous changes in school programmes. The limits of this sketch compel me to refer to the originals for these facts in detail.¹

¹ The few books and articles referred to here are, of course, a small fraction of the number that might be given, but such works are selected as represent the best in their respective fields and yet are simple enough to be of use to the average intelligent teacher.

J. S. Clouston. *Clinical Lectures on Mental Diseases.*
 Emil Kraepelin. *Lehrbuch der Psychiatrie*, 5th ed.
 Havelock Ellis. *The Criminal.*
 Wm. Ferri. *Criminal Sociology.*
 H. H. Donaldson. *The Growth of the Brain.*
 J. Ryland Whitaker. *Anatomy of the Brain and Spinal Chord.*
 Ramon y Cajal. "La Fine Structure des Centres Nerveux." *Proc. Royal Soc.*, Vol. 55.
 C. F. Hodge. "A Microscopical Study of Changes due to Functional Activity in Nerve Cells." (Boston, 1892.) *Journal of Morphology*, Vol. VII, No. 2.
 Burgerstein. "Die Arbeitskurve einer Stunde." *Zeitschrift für Schulgesundheitspflege*, Band IV, Heft. 9, 10.
 H. Emminghaus. "Die Psychischen Störungen in Kindes-Alter:" *Gerhard's Handbuch der Nervenkrankheiten, Nachtrag II.* Tübingen, 1887.
 Keller, "Pädagogische psychometrische Studien." *Biologisher Centralblatt*, 1894. Nos. 1, 2, 9.
 A. Maggiore. "Ueber die Gesetze der Ermüdung. Untersuchungen an Muskeln des Menschen." *Archiv. f. Phys.* (Du Bois Reymond), *Drittes und Viertes Heft*, 1890.
 Mosso. *Die Ermüdung. Leipsic*, 1892.
 Henry J. Berkley. "Alcoholic Poisoning." *J. Hop. Hospital Rep.*, Vol. VI, No. 1.
 C. C. Stewart. "Effect of Acute Alcoholic Poisoning on Nerve Cells." *Jn. Ex. Med.*, Vol. I, No. 4.
 Emil Kraepelin. *Ueber die Beeinflussung einfacher psychischer Vorgänge durch einige Arzneimittel.*
 August Smith. *Die Alkoholfrage und ihre Bedeutung für Volkswohl und Volksgesundheit.*
 C. F. Hodge. "Effect of Alcohol on Animal Activity." *Pop. Sci. Mo.*, Mar. and Apr., 1897.

It was a revolution when the monkish attempt to develop the soul by destroying the body gave place to the saner modern views; but this movement has been hampered seriously by the lack of educated leaders. Until very recently the director of physical education has generally been little more than a splendid physical animal leading in various lines of physical prowess and possessing a repertoire of empirically devised exercises and linements, courses of diet and bathing and rubbing that made muscular giants, in some particular line of those already possessing a physical stamina that could stand almost any hardship, but leaving the weak to look out for themselves or shattering their feeble frame under the strain of the heroic and unphysiological treatment. In fact, this order of things is not yet passed. Many of the leaders in physical culture are still little more than lackeys to lead exercises and to time and rub down athletes, possessing merely a smattering of anatomy and physiology and little acquaintance with the facts of neurology or the alimentary and culinary chemistry. The few educated leaders in this work know very well that such sights as four mile boat races with several collapsed hearts at the finish do not mean physical culture. It may be true that it is better to kill off a few men by over exertion, than to kill adolescent interest in athletics and return to the old monkish order by stopping all sports that are dangerous; but time is fast approaching when this is to be seen in its true light and the efforts of leaders of physical culture are to be directed towards more accurate experiments on the effect of different articles of diet at various ages and seasons of the year and under varying mental and physical tasks; the effect of long and short periods of sleep and the proper periods and alternations of different kinds of work, and of rest and work at different times of life. The present ignorance on these fundamental facts, which are open to direct experiment, is discouraging. A very little has been done at Chicago and Wesleyan and Clark on the subject of foods, but the writer has found absolutely nothing of value in English, and little more in German on the subject of how to rest and recuperate. Nothing is more demanded now than a thorough study of various methods of rest and recuperation; for upon capacity to rest depends capacity to work. The experiments of Mosso, Keller, Emminghaus and others show the

Heinrich Dehio. "Experimentelle Untersuchungen ueber die Veranderungen der Ganglienzellen bei der acuten Alkoholvergiftung. Centbl. f. Nervenkh. und Psych. Marz-Hefl. 1895.

W. O. Atwater. "How Food is Used in the Body." Century, June, 1897. "Preliminary Report of Investigations on Metabolism by Man." Published by the Office of Experiment Stations of the United States Department of Agriculture.

rapid wear of the mental and physical organism in all kinds of work, and indicate the great advantage of short periods of work at high pressure alternating with short periods of rest; but just what gives the greatest rest is as yet a subject of dispute. This much does seem certain, that intricate calisthenics and exercises demanding strong attention, or great physical exertion do not properly rest a brain tired from study. The need for a long period of continuous sleep, especially long in youth, is impressed ever more firmly; but in what way to spend waking periods in order to best rest and recuperate for renewed efforts is still entirely unsettled ground. The matter of temperament and individual peculiarities will, of course, ever complicate the problem.

The larger views of physical training, the relation of the muscles as organs of the will to character, and the relation of bodily to emotional states are yet to receive adequate treatment.

Upon the practical side, it may all be summed up by saying that the stress of physical training will gradually shift from the present undue effort to cultivate strong muscles to an attempt primarily to preserve and foster a strong heart and lungs, nerves, liver, kidneys, stomach, etc. True it is that one of the chief means of developing these vital organs is found in the muscles, yet many of the present forms of exercise which develop muscle endanger or actually injure the vital organs. These must give place to saner measures of exercise, to well placed periods of rest, properly selected diet and clothing, and hygienically constructed dwellings, which are far more potent for physical and mental sanity than anything else in education.

In Conclusion. After surveying the tortuous progress of past centuries in educational ideals and methods, and looking at the intense activity of recent years and the unparalleled advance of knowledge in all of the sciences upon which pedagogy is based, one can but consider the present division among leaders of education as the prelude to the falling of many cherished idols to make way for a new philosophy built upon a larger and better knowledge of nature and of man. Every year is adding new facts to the store; new phases of human life and human needs and possibilities are seen now as never before, and make only the more apparent the present ignorance and the insufficiency of the present systems. *Children must be studied.* With this new center for our educational universe, there must be confusion till more points are fixed and laws of movement known, but with the increase of investigation the new century will furnish data from which the synthetic mind of a Copernicus or a Kant can give such an account of the laws and growth of the human soul as is now little dreamed of in our philosophies.

